Divergence in Popular Diets Relative to Diets Consumed by Americans, and Implications for Diet Selection

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Abstract

Context: Given the seemingly disparate nature of popular weight-loss diets (WLDs), consumers may have a difficult time choosing one. We hypothesized that because most of these diets differ greatly from the way most Americans spontaneously eat, the choice of a WLD may be less critical than the decision to adopt any WLD.
Objective: To assess the degree of similarity among several popular WLDs and that between average diets of Americans and the WLDs as a whole.
Design: One-day menus were randomly selected or constructed from 16 popular diet books (resulting in 17 distinct diets). Usual dietary intakes of individuals were derived from the Continuing Survey of Food Intakes by Individuals (CSFII) 1994-96, 1998.
Main Outcome Measures: Euclidean distances, based on 12 dietary variables, were calculated among the popular WLDs, as well as between the WLDs and intakes from the CSFII.
Results: Euclidean distances among the WLDs ranged from 1.99 to 15.24, with a mean of 6.12 ± 2.83. Mean distance between individuals' intakes from the CSFII and the closest WLD was 3.63 ± 1.24, while the mean distance between individuals' intakes and the farthest WLD was 10.58 ± 1.10. Mean distance between individuals' intakes and the WLDs considered together was 6.04 ± 1.10.
Conclusions: While the mean Euclidean distances between individuals' intakes and popular WLDs demonstrated meaningful differences, the differences among the WLDs were slightly greater and, in multivariate space, surrounded the diets consumed by Americans. This may have implications for the selection of a WLD in persons seeking to lose weight.

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Introduction

The prevalence of obesity has increased dramatically over the past 30 years. Approximately two thirds (66.2%) of US adults age 20-74 years were overweight or obese in the period 2003-04, compared with 47.1% in the period 1976-80. Almost one third of US adults were obese as of 2003-04, compared with only 15.0% in 1976-80.[1] A proliferation of popular weight-loss diets (WLDs) has coincided with the increased prevalence of overweight/obesity. Popular diet books are purchased by millions of Americans, as evidenced by their almost constant presence on the *New York Times* Best Sellers List for advice books.[2] Even though these diets may vary greatly in macronutrient content and in other dimensions, it is not clear how much the WLDs actually differ from one another relative to the degree to which they differ (when considered together) from the usual diets of Americans.

There are substantial differences among popular WLDs. Some diets severely restrict fat intake,[3] while others restrict carbohydrate intake while allowing liberal intake of fat.[4] Still others are selective in the types of carbohydrates that they allow.[5] In reaction, consumers and media pundits have expressed the view that deciding on a course of action for weight loss is all but impossible because of the difficulty in choosing among seemingly widely disparate popular diets.

However, despite some marked disparities in rhetoric, virtually all WLDs have important features in common. For example, we know of no popular diet that recommends or allows unlimited consumption of foods such as French fried potatoes, candy, or ice cream. Because of the common aspects of all popular WLDs, we conjectured that if the average American randomly picked any popular WLD, it would likely be more similar to any other popular WLD than their current diet. Were this the case, those trying to lose weight could be advised that any WLD may be more effective than the diet they are currently consuming. Specifically, we hypothesized that the differences among popular WLDs would be relatively small compared with the differences between usual individual intakes and the WLDs considered together. This would suggest that the choice of a specific WLD would be less critical to weight loss efforts than simply the decision to go on any WLD. Using statistical methods, we assessed the similarities among several popular diets and the similarity between average diets of Americans and the popular diets.

Material and Methods

Diets

We included 16 diet books and 17 WLDs (both vegetarian and non-vegetarian versions of Eat to Live) in the analysis (Table 1). Diets were included on the basis of the availability of a popular book published within the previous 10 years, authored by an "expert" (liberally defined) in the field.[3-18]

Diet Analysis

A 1-day menu for each diet was randomly selected from the sample menus (within a randomly selected phase of a diet, where applicable) presented in the diet books. When sample menus were not available, a representative 1-day menu based on the particular diet's guidelines and recommendations was constructed by the investigators. The diets were compared on 12 variables: energy, percent of energy from fat, percent of energy from saturated fatty acids, percent of energy from monounsaturated fatty acids, percent of energy from polyunsaturated fatty acids, cholesterol, total dietary fiber, calcium, vitamin E, total folate, sodium, and glycemic load (GL). These variables were chosen on the basis of their associations with disease risk in previous studies,[19,20] their inclusion in well-known dietary guidelines,[21] or stated importance in many weight-loss plans.

With the exception of GL, nutrient analyses of the sample menus of each diet were conducted using the Nutrition Data System for Research (NDS-R), version 4.05_33 (2002), developed by the Nutrition Coordinating Center at the University of Minnesota.[22] NDS-R uses the United States Department of Agriculture (USDA) Nutrient Database for Standard Reference and its periodic revisions as the primary

data source and is supplemented by information from the scientific literature and food manufacturers. The output provides values for more than 130 nutrients.

The investigators used published methods to calculate GL.[23] Briefly, to determine GL for a 1-day menu, all carbohydrate-containing foods were identified. Each food was assigned a glycemic index (GI) value from a published table of GI values,[24] using glucose as the reference food. For foods with no published GI values, values were imputed on the basis of published values of foods judged to be similar. Foods with no published GI values containing little carbohydrate (eg, meats, poultry, fish, cheese, eggs, and salad vegetables) were not included in the GL calculations due to their minimal glycemic effect. When there were multiple GI values listed for a given food in the GI table, the mean GI value was assigned. An exception to this was in the case of brand-name foods: if a GI value for a brand-name food was available, this was used instead of a mean value. The GL of an individual food was calculated by multiplying the GI value of the food by the number of grams of available carbohydrate per serving size specified by the diet and then dividing by 100.[24] The GLs of all carbohydrate-containing foods in the menu were summed, resulting in the overall GL for the 1-day menu.[23]

Assessment of Usual Dietary Intake of Individuals

Usual dietary intake for individuals was derived from the Continuing Survey of Food Intakes by Individuals (CSFII) 1994-96, 1998. The CSFII is a national survey conducted by the Agricultural Research Service of the USDA . The CSFII 1994-96, 1998 provided information on 2-day food and nutrient intakes by 20,607 persons of all ages. Data collection in the 1994 to 1996 portion of the survey included persons of all ages in a nationally representative sample of noninstitutionalized persons residing in households in the United States, in each of 40 analytic domains defined by sex, age, and income level. Information on dietary intake was obtained with the use of 2 nonconsecutive 24-hour dietary recalls administered in person by a trained interviewer.[25] The nutrient database for the CSFII 1994-96, 1998 contains values for more than 50 nutrients, including the nutrients of interest in this analysis. GL values for foods reported on the survey were recently added as part of a study to add GI and GL values to the nutrient database for a commonly used dietary assessment instrument, the National Cancer Institute's Diet History Questionnaire.[26]

Statistical Analysis

For the purposes of this study, only CSFII data for individuals 18 years of age and older were included. This resulted in a CSFII sample size of 9582 individuals. The 2 days of intake data for each individual were averaged.

Because we were interested in measuring the distance between reported dietary intake from the CSFII and recommended dietary intake based on the 17 popular WLDs, as well as the distances among the WLDs, Euclidean distances were calculated. Euclidean distance measures the distance from one multivariate observation to another without regard to the correlations among the variables (see reference 27 for further clarification).

We began by calculating the sample mean and standard deviation for each nutrient intake variable based upon the 9582 individuals from the CSFII. Each variable was standardized using its respective sample mean and standard deviation. Specifically, a standardized variable (Z_{ij}) for the ith subject on the jth variable was calculated as:

$$Z_{ij} = \frac{Y_{ij} - \hat{\mu}_j}{\hat{\sigma}_j}$$

where Y_{ij} represents the value of the jth nutrient value for individual i, $\hat{\mu}_j$ represents the sample mean of the jth nutrient variable, and $\hat{\sigma}_j$ represents the sample standard deviation of the jth nutrient variable. Similarly, a standardized variable (Z_{kj}) for the kth diet was calculated as:

$$Z_{kj} = \frac{Y_{kj} - \hat{\mu}_j}{\hat{\sigma}_j}$$

where Y_{kj} represents the recommended value of the jth nutrient as estimated from the sample menu for the kth diet, $\hat{\mu}_j$ represents the sample mean of the jth nutrient variable based on the person level information from the CSFII data, and $\hat{\sigma}_j$ represents the sample standard deviation of the jth nutrient variable based on person information. Euclidean distance between a person's reported intake and a popular diet's recommended intake was then calculated as:

$$\delta_{ik} = \sqrt{\sum_{j=1}^{J} (Z_{ij} - Z_{kj})^2}$$

These distances were used to rank the closeness of individuals' reported intakes to those recommended by the WLDs. The distance between 2 WLDs, k and k', was calculated as:

$$\delta_{kk'} = \sqrt{\sum_{j=1}^{J} (Z_{kj} - Z_{k'j})^2}$$

To compare the median recommended nutrient intake to the median reported dietary intake of nutrients, Wilcoxon rank sum tests were used. A Bonferroni correction was applied to control the experiment-wise Type I error rate.

Results

Comparison of the WLDs and CSFII Data

A comparison of the 12 dietary variables of interest showed that the WLDs varied widely among the variables analyzed (Table 2). For example, energy intake varied from 753 kcal/d (Eat to Live, vegetarian for aggressive weight loss) to 2221 kcal/d (Zone); saturated fat intake ranged from 2.3% (Ornish) to 23.7% (Atkins); and calcium varied from 441 mg/d (Atkins) to 1676 mg/d (Zone). In addition, for the most part there was a wide discrepancy in mean amounts calculated from sample menus of the WLDs and actual intake by individuals calculated using CSFII 1994-96, 1998 data (Table 3). Dietary factors positively associated with disease risk in previous studies ranged from 18.5% (total fat) to 55.9% (GL) higher in individuals compared with the WLDs. Dietary factors inversely associated with disease risk ranged from 40.3 % (dietary fiber) to 52.7% (folate) lower in individuals compared with the WLDs. There were no statistically significant differences in energy, polyunsaturated fat, cholesterol, vitamin E, calcium, or sodium between individuals' intakes and the WLDs.

Euclidean Distances Among the WLDs

The Euclidean distances among the WLDs ranged from 1.99 (Aronne and Volumetrics) to 15.24 (Atkins and Ornish) (Table 4). EatRight was closest to the other diets, with a mean Euclidean distance from the other diets of 4.59 ± 2.21, while Atkins was farthest, with a mean distance from the other diets of 10.92 ± 2.62. The mean distance among all diets was 6.12 ± 2.83.

Euclidean Distances Between the WLDs and Individuals' Intakes

The mean Euclidean distance between individuals' usual intakes from the CSFII and the closest WLD (whichever diet that may have been for each individual) was 3.63 ± 1.24, while the mean distance between individuals' usual intakes and the farthest diet (whichever diet that may have been for each individual) was 10.58 ± 1.10. The mean distance between individuals' intakes and the WLDs considered together was 6.04 ± 1.10. The smallest average Euclidean distance between individuals' intakes and the WLDs was with Cheskin (mean distance of 4.36 ± 1.61) (Table 5). The greatest average distance between individuals' intakes and the WLDs was with Ornish (mean distance of 9.84 ± 1.39). More than 54% of CSFII participants had diets that were closest to Cheskin or Sugar Busters compared with the other diets, while less than 1% were closest to Ornish (Figure). The proportion of individuals' diets with a Euclidean distance of > 15.24 (the greatest distance between WLDs) from at least 1 diet was 0.0033.

Sensitivity Analyses

Sensitivity analyses were performed, which (1) included percent of energy from protein; (2) substituted absolute amount of fat for percent of energy from fat; (3) eliminated micronutrients with little purported association with body weight (vitamin E, folate, and sodium); (4) included only obese persons; and (5) used Mahalanobis distance instead of Euclidean distance. The results of each of these analyses did not differ appreciably from the results reported above.
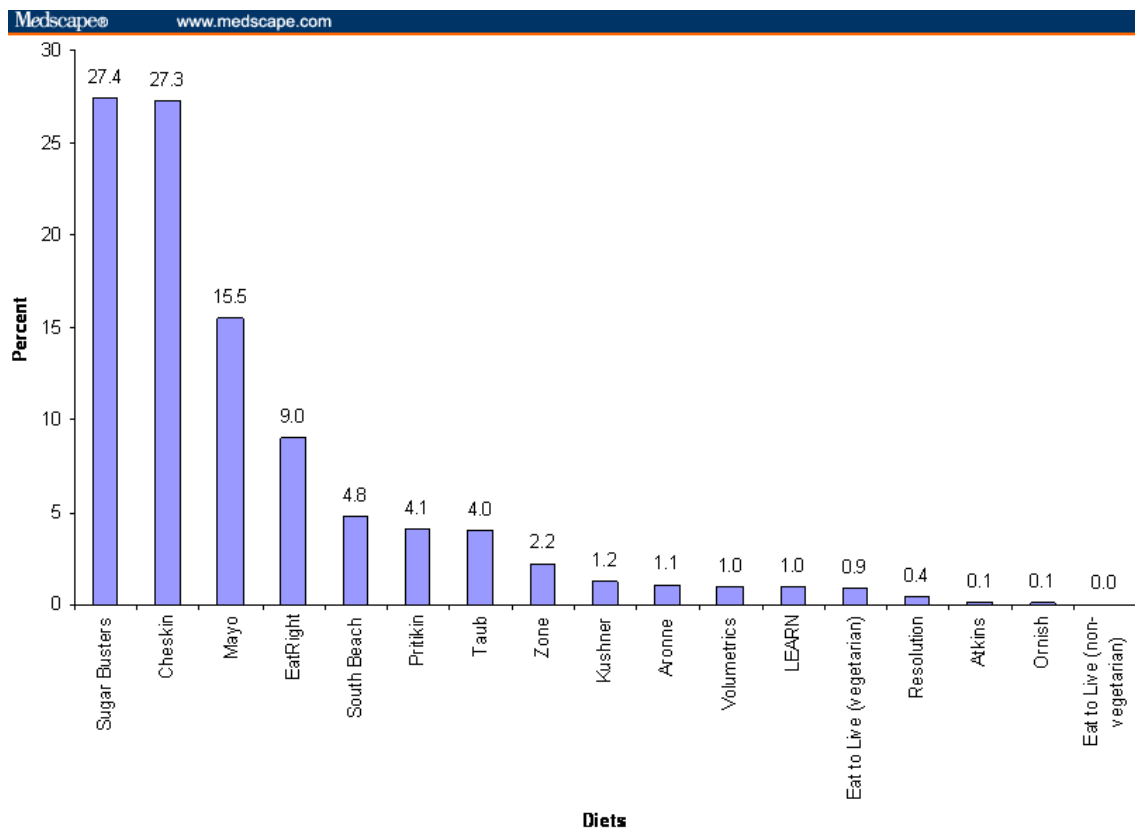
Figure.

Percentage of individuals from the CSFII with self-reported dietary intakes closest to one of the popular weight-loss diets.

Discussion

This study comparing popular WLDs with the usual dietary intakes of Americans resulted in several important findings. First, popular WLDs promulgated over the past 10 years varied greatly in their macronutrient composition and micronutrient content. In addition, when taken as a whole, the WLDs varied substantially from the usual intake of Americans in several important ways. However, when compared on the basis of Euclidean distances, this study demonstrated that the usual diets of a representative sample of Americans were actually closer to the dietary recommendations of the 17 popular WLDs taken as a whole than the WLDs were to each other.

Our results indicate that the 17 diets included in this study varied widely with regard to many of the nutrient variables included in the analysis. For example, individual fatty acid contents (saturated, monounsaturated, and polyunsaturated) varied by at least a factor of 6, and most nutrients varied by at least a factor of 4 among the diets. Of interest (considering that these were all weight-loss diets), diets differed by a factor of 3 in energy content, varying from just over 750 kcal/d (Eat to Live, vegetarian for aggressive weight loss) to greater than 2200 kcal/d (Zone).

The mean nutrient composition of the WLDs was in greater agreement with published dietary guidelines[21,28] than mean intakes for individuals calculated from CSFII data. While mean intakes of polyunsaturated fat, vitamin E, and sodium from CSFII were very close to the mean values calculated from the WLDs, mean intakes of several nutrients associated with a higher risk of disease in previous studies (energy, saturated fat, cholesterol, and GL) were substantially higher in individuals based on CSFII data. Conversely, mean intakes of several nutrients associated with a reduced risk of disease (dietary fiber, folate, and calcium) were much lower in individuals compared with the WLDs.

Despite the apparent differences in nutrient composition of the WLDs considered together and nutrient intakes of individuals (and contrary to what we hypothesized), this study demonstrated that the usual diets of a representative sample of Americans were actually more similar to the WLDs taken as a whole than the WLDs were to each other. We originally speculated that based on Euclidean distances, the popular diets included in this study would be clustered at a considerable distance from a second cluster representing the usual intakes of Americans. However, this proved not to be the case. In fact, the probability that an individual's diet had a distance from at least 1 of the WLDs that was greater than the distance between the 2 most dissimilar WLDs was less than 1%.

What are the possible ramifications of these findings? Because we initially speculated that the WLDs would form a cluster at some distance from the usual diets of Americans, we postulated that an individual seeking to lose weight could choose any one of the popular diets at random and (assuming one of the WLD diets was optimal for that person) be closer to consuming their optimal diet than if they stayed on their current diet. In other words, the choice of diets would be a far less critical factor than would simply adopting one of the diets.

The results of this study indicated otherwise. Because the distance between the usual diets of Americans and the WLDs considered together (6.04) was similar to the mean distance among the popular diets (6.12), the choice of a WLD may, in fact, be more critical than we hypothesized. Assuming that one of the diets is best for an individual, he/she might be more successful in losing weight by selecting a diet that is most dissimilar to his/her usual diet than in selecting one that is very similar. An individual trying to lose weight without success that is already 'near' (a small Euclidean distance from) one of these WLDs may be more successful by choosing a diet that is farther (a larger Euclidean distance) from his/her usual diet. There is evidence from previous studies that when individuals trying to lose weight adopt new dietary patterns that vary markedly from their spontaneous eating patterns, weight loss may be enhanced.[29] When one couples this with data suggesting that WLDs varying radically in composition do not produce radically different weight losses *on average*,[30] a subject (baseline diet)-by-treatment (recommended WLD) interaction seems quite plausible. That is, subjects eating, for example, in an *Atkins-like* way may do best on an *Ornish-like* diet, and *vice versa*. While acknowledging that it may be challenging for

individuals to radically alter life-long dietary patterns, we believe this hypothesis deserves consideration for future research.

Within this article, we calculated Euclidean distances instead of the more traditional statistical measure of Mahalanobis distance. Our justification for this approach was 2-fold. First, all dietary variables were standardized prior to calculating distances. Mahalanobis distance is preferable when variables are measured in different units and have differing variances.[27] However, since we standardized the variables prior to calculating distances, all variables were "unit-less" and the variances were set to 1 for all variables. Our second justification for using Euclidean distances was that we were not interested in the distances with regard to the association among the variables. Mahalanobis distance takes into account the correlation structure among the variables studied. For the purposes of this article, we were concerned with simple distances, not distances relative to a pattern of association. We did conduct a sensitivity analysis using Mahalanobis distances, and none of our results changed appreciably using this measure.

Our conclusions are limited by the absence of indication in the CSFII data regarding how many individuals were actively trying to lose weight, whether they were successful in doing so, or whether they were attempting to follow any particular dietary pattern. The impact of such data on our results, however, is likely to be limited, because individuals' statements of intention to lose weight correlate poorly with adherence to weight-loss dietary patterns and with actual weight loss.[31] It should also be noted (as discussed previously) that some of the diet books did not include sample menus. In those cases, we carefully constructed sample menus in strict accordance with the respective diet's macronutrient recommendations, as presented in its book. Finally, we analyzed the WLDs as presented in the books rather than assessing dietary intake in persons on each diet. Our objective was to analyze the WLDs as recommended in each book, not how compliant persons following the diets might be.

In summary, based on Euclidean distances, the popular WLDs included in this study were more similar to the spontaneous diets of a representative sample of Americans than originally hypothesized. This could have important implications with regard to the choice of diets for individuals attempting to lose weight. Further studies are needed to determine the impact on weight loss of adopting diets of varying Euclidean distances from spontaneous eating patterns.

Table 1. Popular Weight-Loss Diets Included in the Analysis

Title of Book	Author(s)	Year published
The South Beach Diet: The Delicious, Doctor-Designed, Foolproof Plan for Fast and Healthy Weight Loss	Arthur Agatston, MD	2003
Weigh Less, Live Longer: Dr. Lou Aronne's "Getting Healthy" Plan for Permanent Weight Control	Louis J. Aronne, MD	1997
Dr. Atkins' New Diet Revolution	Robert C. Atkins, MD	2002
The LEARN Program for Weight Control	Kelly D. Brownell, PhD	2000
Losing Weight for Good: Developing Your Personal Plan of Action	Lawrence J. Cheskin, MD	1997
Eat to Live: The Revolutionary Formula for Fast and Sustained Weight Loss	Joel Fuhrman, MD	2003
The Resolution Diet: Keeping the Promise of Permanent Weight Loss	David Heber, MD, PhD	1999
Mayo Clinic on Healthy Weight	Donald D. Hensrud, MD	2000
Dr. Kushner's Personality Type Diet	Robert F. Kushner, MD Nancy Kushner, MSN, RN	2003
Eat More, Weigh Less: Dr. Dean Ornish's Life Choice Program for Losing Weight Safely While Eating Abundantly	Dean Ornish, MD	1997
The Pritikin Weight Loss Breakthrough: Five Easy Steps to Outsmart Your Fat Instinct	Robert Pritikin	1998
The Volumetrics Weight-Control Plan: Feel Full on Fewer Calories	Barbara Rolls, PhD Robert A. Barnett	2000
The Zone	Barry Sears, PhD	2000
The New Sugar Busters! Cut Sugar to Trim Fat	H. Leighton Steward Sam S. Andrews, MD Morrison C. Bethea, MD Luis A. Balart, MD	2003
Balance Your Body, Balance Your Life: Dr. Taub's 28-Day Permanent Weight Loss Plan	Edward A. Taub, MD	1999
EatRight Heart Smart	Roland L. Weinsier, MD, DrPH	1998

Table 2. A Comparison of the Popular Weight-Loss Diets

Variable	SoB[1]	Ar[2]	At[3]	LE	Ch[4]	EL[5]	EL[6]	Re	Ma[7]	Ku	Or	Pr[8]	Vo	Zo	SB	Ta	ER[9]
Energy, kcal/d	1263	1082	1766	1574	1311	753	1701	1251	1048	1303	1815	1837	1461	2221	1377	2190	1388
Total fat, % en	50.7	15.8	68.0	19.5	21.7	25.6	23.8	18.2	20.0	23.0	14.7	17.1	16.4	50.8	39.9	25.8	26.1
SFA, % en	14.6	3.9	23.7	7.2	6.2	3.5	3.8	4.4	3.7	10.2	2.3	4.7	4.5	13.4	12.9	6.1	9.4
MUFA, % en	26.2	6.0	30.4	7.3	9.9	7.6	6.9	7.4	7.8	7.9	3.2	4.6	5.3	18.5	13.7	11.7	7.3
PUFA, % en	5.9	4.1	8.5	2.5	3.5	12.1	10.2	4.2	6.7	3.3	7.5	6.1	4.5	15.1	9.4	5.8	7.4
Cholesterol, mg/d	612	84	730	258	136	0	51	135	69	69	2	160	100	336	519	120	86
Dietary fiber, g/d	7.4	26.0	8.3	31.7	18.2	25.3	49.1	24.6	17.7	18.2	51.5	21.1	31.9	23.5	24.1	39.3	29.8
Vitamin E, mg/d	12.3	6.9	9.7	6.3	4.5	2.9	4.9	17.0	3.9	26.5	6.2	4.8	7.4	11.0	7.0	7.5	11.5
Folate, µg/d	372	365	384	732	206	410	857	721	271	312	1318	374	237	744	594	756	410
Calcium, mg/d	887	806	441	1341	975	555	1027	984	805	1610	1449	556	888	1676	652	702	1033
Sodium, mg/d	4281	2041	3794	2923	4804	1115	1641	1787	1808	3183	3280	4323	3776	5586	2319	3964	3517
Glycemic load	4.5	57.8	4.6	101.8	98.2	26.3	87.6	115.4	85.0	87.4	115.1	173.2	122.8	38.1	42.8	124.4	63.9

SoB = South Beach; Ar = Aronne; At = Atkins; LE = LEARN; Ch = Cheskin; EL = Eat to Live; Re = Resolution; Ma = Mayo; Ku = Kushner; Or = Ornish; Pr = Pritikin; Vo = Volumetrics; Zo = Zone; SB = Sugar Busters; Ta = Taub; ER = EatRight; SFA = saturated fatty acids; MUFA = monounsaturated fatty acids; PUFA = polyunsaturated fatty acids.

[1] Phase one.
[2] Menu plan I (1200 kcal/d).
[3] Induction phase.
[4] Menu 1 (1200-1400 kcal/d).
[5] Meal plan 1 (vegetarian; for aggressive weight loss).
[6] Meal plan 2 (non-vegetarian; for moderate weight loss).
[7] 1200 kcal/d diet.
[8] "Better Still" menu plan.
[9] Meal pattern 1.

Table 3. A Comparison of the Popular Weight-Loss Diets and Dietary Intake in Individuals From the CSFII 1994-96, 1998[1]

Variable	Popular diets (n = 17)		CSFII 1994-96, 1998 (n = 9582)		% Difference of CSFII from popular diets	P
	Mean ± SD (median)	Min-Max	Mean ± SD (median)	Min-Max		
Energy, kcal/d	1491 ± 394 (1388)	753-2221	1952 ± 848 (1805)	184-13,297	30.9	.0129
Total fat, % en	28.1 ± 15.2 (23.0)	14.7-68.0	33.3 ± 7.9 (33.5)	1.1-67.8	18.5	.0018[*]
Saturated fat, % en	7.9 ± 5.6 (6.1)	2.3-23.7	11.1 ± 3.4 (11.0)	0.2-29.9	40.5	.0007[*]
Monounsaturated fat, % en	10.7 ± 7.6 (7.6)	3.2-30.4	12.7 ± 3.5 (12.8)	0.5-29.0	18.7	.0013[*]
Polyunsaturated fat, % en	6.9 ± 3.4 (6.1)	2.5-15.1	6.8 ± 2.6 (6.5)	0.3-26.5	-1.4	.7543
Cholesterol, mg/d	204 ± 218 (120)	0-730	270 ± 184 (224)	0-2701	32.4	.0132
Dietary fiber, g/d	26.3 ± 12.1 (24.6)	7.4-51.5	15.7 ± 8.6 (14.1)	0.6-120	-40.3	< .0001[*]
Vitamin E, mg/d	8.8 ± 5.8 (7.0)	2.9-26.5	8.1 ± 6.1 (6.9)	0.2-155.9	-8.3	.5788
Folate, µg/d	533 ± 289 (410)	206-1318	252 ± 159 (217)	10-2273	-52.7	< .0001[*]
Calcium, mg/d	964 ± 366 (887)	441-1676	734 ± 430 (648)	47-4904	-23.9	.0054
Sodium, mg/d	3185 ± 1249 (3280)	1115-5586	3296 ± 1570 (3046)	69-22,266	3.5	.9516
Glycemic load	79.4 ± 46.2 (87.4)	4.5-173.2	123.8 ± 58.0 (114)	7.6-662.1	55.9	.0021[*]

[*]Significant after a Bonferroni correction.

Table 4. Euclidean Distances Between the Popular Weight-Loss Diets

Diet	Ar	At	LE	Ch	EL1	EL2	Re	Ma	Ku	Or	Pr	Vo	Zo	SB	Ta	ER	Mean ± SD
SoB	9.01	4.06	8.64	7.53	8.85	10.22	8.88	8.42	8.03	12.59	9.26	9.30	5.86	5.12	8.17	7.67	8.22 ± 2.01
Ar	-	12.29	3.33	2.86	3.62	4.96	3.06	1.83	4.53	7.20	2.94	1.99	8.82	5.80	4.28	2.88	4.96 ± 2.95
At	-	-	11.74	10.89	11.61	12.79	12.11	11.63	11.25	15.24	12.28	12.47	7.42	7.39	10.95	10.60	10.92 ± 2.62
LE	-	-	-	4.12	5.43	4.15	2.62	4.29	4.82	5.33	3.97	3.70	7.73	5.22	2.95	3.38	5.09 ± 2.40
Ch	-	-	-	-	4.85	6.48	4.49	2.59	4.33	8.66	2.87	2.47	7.96	5.52	4.63	3.14	5.21 ± 2.47
EL1	-	-	-	-	-	4.47	4.88	2.85	6.41	7.68	4.55	4.46	7.57	5.10	5.03	3.65	5.69 ± 2.25
EL2	-	-	-	-	-	-	4.40	5.45	7.14	3.82	5.49	5.26	7.54	5.89	3.30	4.45	5.99 ± 2.49
Re	-	-	-	-	-	-	-	3.86	4.05	5.80	3.90	3.83	8.11	5.60	3.50	3.44	5.16 ± 2.52
Ma	-	-	-	-	-	-	-	-	4.88	8.09	2.84	2.62	8.27	5.43	4.75	3.09	5.06 ± 2.74
Ku	-	-	-	-	-	-	-	-	-	8.82	5.27	4.53	7.98	6.27	5.79	3.61	6.11 ± 2.08
Or	-	-	-	-	-	-	-	-	-	-	7.42	7.46	9.57	8.60	5.31	7.04	8.04 ± 2.78
Pr	-	-	-	-	-	-	-	-	-	-	-	2.17	8.57	5.98	4.14	3.45	5.32 ± 2.79
Vo	-	-	-	-	-	-	-	-	-	-	-	-	8.82	6.21	4.20	2.85	5.15 ± 2.99
Zo	-	-	-	-	-	-	-	-	-	-	-	-	-	4.68	6.68	6.50	7.63 ± 1.22
SB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.71	4.18	5.73 ± 1.08
Ta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.46	5.12 ± 2.04
ER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.59 ± 2.21

SoB = South Beach; Ar = Aronne; At = Atkins; LE = LEARN; Ch = Cheskin; EL1 = Eat to Live (vegetarian); EL2 = Eat to Live (non-vegetarian); Re = Resolution; Ma = Mayo; Ku = Kushner; Or = Ornish; Pr = Pritikin; Vo = Volumetrics; Zo = Zone; SB, Sugar Busters; Ta = Taub; ER = EatRight.

Table 5. Average Euclidean Distances Between Dietary Intake in Individuals From the CSFII 1994-1996, 1998 and the Popular Weight-Loss Diets

Diet	Euclidean distance fromCSFII to each diet[1]
Cheskin	4.36 ± 1.61
EatRight	4.53 ± 1.40
Mayo	4.73 ± 1.86
Sugar Busters	4.77 ± 1.26
Pritikin	5.06 ± 1.65
Volumetrics	5.28 ± 1.68
Aronne	5.39 ± 1.81
Taub	5.64 ± 1.32
Kushner	5.65 ± 1.17
Eat to Live (vegetarian)	5.78 ± 1.65
LEARN	5.87 ± 1.43
Resolution	5.93 ± 1.46
South Beach	6.47 ± 1.53
Zone	6.96 ± 1.29
Eat to Live (non-vegetarian)	7.34 ± 1.33
Atkins	9.02 ± 1.72
Ornish	9.84 ± 1.39

[1] Mean ± SD.

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